Form INV-2 EMISSION POINT DESCRIPTION

Duplicate this form for EACH Emission POINT

1) Company/Facility Name	Grain	Elevato	r Inc				1a) Form INV	/-2 Page	Olivi	of	
2) Emission Point Number	EP-2		1 1110								
3) Emission Point Description		ın Grain	Drver	Fmis	sions						
4) Is this stack/vent used as an Emergency Bypass Stack?	No		Yes		5.0.10						
If YES, for which stack(s)? List Emiss	ion Point N	los.:									
			EMISS	SION PO	NT INFORMATIO	N					
5) Emission Point Type											
Stack/Vent											
Fugitive (specify)											
Other (specify) Emis	sions th	rough s	idewal	l of dr	yer						
6) Stack Shape and Dimensions: (int	erior dimer	nsions at ex	xit point)								
Circular Diameter:			inches								
Rectangular Dimensions:			inches	x		inches					
Other Dimensions			inches								
7) Stack Height Above Ground		feet									
8) Does the Emission Point have a ra	in cap (or a	nything els	se) which	obstruct	s the flow of gase	s leaving the	e Emission Poi	nt, or a ho	rizontal di	scharge?	
No YES (specify):											
			9) COMPC	OSTION (OF EXHAUST STR	EAM					
Exhaust Stream Characteristics	Em Compositio	nission Poir on of Exhau		Un	ts of Measure						
a) Flow Rate 5	0,000				ACFM S	CFM					
b) Temperature 2	00			De	gree Fahrenheit						
				<mark>10</mark>) BYP	ASS STACKS						
Bypass Stack – Emission Point No.		Bypass S Description									
Bypass Stack – Emission Point No.	Stack										
	11) LI			ITS VEN	TING THROUGH 1	HIS EMISSION	ON POINT				
Emission Unit No.	Emissio	n Unit No			Emission Uni	t No.		Emission	Unit No.		
EU-2		_									

Duplicate this form as needed

TYPE ALL INFORMATION

(DNR Form 542-4004. November 1, 2006)

Form INV-3 EMISSION UNIT DESCRIPTION – POTENTIAL EMISSIONS

Duplicate this form for EACH Emission UNIT

1)	Company/Facility Name			3rain E	Eleva	ato	r Inc			<mark>1a</mark>	Form INV-3 Pa	ige		of	
<mark>2</mark>)	Emission P	oint Number	Е	P-2						•		'			
					E	MISS	SION UNIT ((PROCESS)	IDENTIFICATION &	DESCRIF	TION				
<mark>3</mark>)	Emission U	nit Number	E	U-2											
<mark>4</mark>)	SCC Number	er	3	02005	527										
<mark>5</mark>)	Description	of Process	C	Columi	n Gr	ain	Drying					,			
<mark>6</mark>)	Date of Con		3-1-19	957		<mark>7</mark>)	Date of In	stallation	3-1-1957	<mark>8</mark>)	Date of Modifica	ation			
<mark>9</mark>)		al – OR Fuels ase for EACH		t	Cor	'n									
<mark>10</mark>)	Federally E	nforceable Lir	nit		50 1	tons	s PM ₁₀ /y	yr for the	e entire facility	′					
<mark>11</mark>)	Permit or R	ule Establishi	ng Limit		08-	A-0	00								
<mark>12</mark>)	Maximum H	lourly Design	Rate		84					To	ns		Per H	our	
<mark>13</mark>)							AIR POL	LUTION CO	NTROL EQUIPMEN	T (CE)					
		uipment Numb													
		uipment Desci													
		uipment Numb													
	Control Equ	uipment Desci	ription					DOTENTIAL	EMISSIONS						
		15		16			17	18	<mark>19</mark>	20	21	22 Potential		Bartana	<mark>23</mark>
Ai	Air Pollutant Emission Factor			nission Fa Units	ictor	s	ource of E.F.	Ash or Sulfur %	Potential Hourly Uncontrolled Emissions (Lbs/Hr)	Combine Contro Efficiend	Transfer	Contre	olled	Em	tial Annual nissions ons/Yr)
				os/ton		ΑP	-42		.79					2.35	,
	PM-10	.055	Lk	os/ton		ΑP	-42		4.62					13.7	' 5
	SO ₂														
	NOx														
	voc														
	со														
	Lead														
A	Ammonia														
	PC	OTENTIAL E	MISSIOI	NS - HA	Ps ar	nd ac	<mark>lditional r</mark>	egulated a	<mark>ir pollutants – lis</mark>	t the pol	lutant name in	Column	<mark>14</mark>		

*Sources of Emission Factors: CEM .. Stack Test .. Mass Balance .. AP-42 .. WebFIRE.. TANKS.. EPA-L&E .. Worksheet .. Other – Specify

Duplicate this form as needed TYPE ALL INFORMATION (DNR Form 542-4001. November 1, 2006)

Form INV-3 EMISSION UNIT DESCRIPTION – POTENTIAL EMISSIONS

Duplicate this form for EACH Emission UNIT

1)) Company/Facility Name			rain I	Elev	/ator	Inc.			1a) Fo	rm INV-3 Pa	ge		of	
<mark>2</mark>)	Emission P	oint Number	E	P-2						•			•			
					ı	EMISSI	ON UNIT (PROCESS)	IDENTIFICATION &	DESCRI	PTIO	N				
<mark>3</mark>)	Emission U	nit Number	Е	U-2												
<mark>4</mark>)	SCC Number	er	1	0200	602											
<mark>5</mark>)	Description	of Process	N	latura	l Ga	as Co	ombust	ion								
<mark>6</mark>)	Date of Con		3-1-57	7		<mark>7</mark>)	Date of In	stallation	3-1-57	8)	Dat	te of Modifica	ition			
<mark>9</mark>)		al – OR Fuels ase for EACH		:	Na	tural	Gas									
<mark>10</mark>)	Federally E	nforceable Lir	mit		50	tons	PM ₁₀ /y	r for the	e entire facility	/						
<mark>11</mark>)	Permit or R	ule Establishi	ng Limit		08	-A-00	00									
<mark>12</mark>)	Maximum H	lourly Design	Rate		.09	933				M	Mcf	•		Per H	lour	
<mark>13</mark>)							AIR POL	LUTION CO	NTROL EQUIPMEN	T (CE)						
		ipment Numb														
		uipment Desci	•													
		ipment Numb														
	Control Equipment Description POTENTIAL EMISSIONS															
		15		16		1	17	18	<mark>19</mark>	20		21	22		D-1	<mark>23</mark>
Ai	<mark>14</mark> ir Pollutant	Em	nission Fa Units	actor	So	urce of E.F.	Ash or Sulfur %	Potential Hourly Uncontrolled Emissions (Lbs/Hr)	Combin Contro Efficien	ol	Transfer Efficiency	Potentia Contr Emissions	olled	Em	tial Annual iissions ons/Yr)	
	PM-2.5												•	,	,	
	PM-10															
	SO₂	0.6	Lb	s/MM	cf	AP-	42		.06						.09	
	NOx	100	Lb	s/MM	cf	AP-	42		9.33						14.4	5
	voc	5.5	Lb	s/MM	cf	AP-	42		.51						.79	
	со	84	Lb	s/MM	cf	AP-	42		7.84						12.1	4
	Lead															
P	Ammonia	3.2	Lb	s/MM	cf	Web	FIRE		.30						.46	
	PC	OTENTIAL E	MISSION	<mark>IS - HA</mark>	Ps a	nd ad	<mark>ditional r</mark>	egulated a	<mark>ir pollutants – lis</mark>	t the po	lluta	nt name in	Column	<mark>14</mark>		
	Hexane	1.8	Lb	s/MM	cf	AP-	42		.17						.26	
For	maldehyde	.075	Lb	s/MM	cf	AP-	42		.01						.01	
														_		

Duplicate this form as needed TYPE ALL INFORMATION (DNR Form 542-4001. November 1, 2006)

^{*}Sources of Emission Factors: CEM .. Stack Test .. Mass Balance .. AP-42 .. WebFIRE.. TANKS.. EPA-L&E .. Worksheet .. Other – Specify

Cames INIV. 4 C	THAIL IACIOOIN	DECODIDATION	ACTUAL	ENTICOLONIC
FORM INV-4 E	MISSION UNIT	DESCRIPTION -	AGIUAL	FINISSIONS

Duplicate this form for EACH Emission UNIT

1)	Company/Faci	ility Na	ame	Gra	ain	Elevator I	nc.						<mark>1a)</mark> Foi	m IN	V-4 Page	IOII OIVII		of	
<mark>2</mark>)	Emission Year	r		20-	-	3)	Emi	ssion Point	Numb	er			EP-2				,		
						EMIS	SION	UNIT – ACT	UAL (PERATI	ONS A	ND EMI	SSIONS						
<mark>4</mark>)	Emission Unit	Numb	per	EU	-2						5) S	CC Num	ber	302	200527				
<mark>6</mark>)	Description of	Proce	ess	Col	lui	mn Grain I	Dry	ing											
				ı	_			ACTU	IAL T	HROUGH	IPUT								
<mark>7</mark>)	Raw Material					orn			1	1			1						
<mark>8</mark>)	Actual Throug	hput -	- Yearly To	tal	25	5,000			<mark>9</mark>)	Units R		terial	Ton	S					
			10) Perce	ant of	Tot	tal Operating Ti	ma	Actual Oper		Rate/Sch s/Day	nedule		12) Da	ve/M	ook	1	3) W	eeks/Qua	artor
	JAN – MAR		10) 1 6100	JIIL OI			iie	,	10					5	JON		<i>3)</i> •••	4	ai tei
	APR – JUN					0			0	<u></u>				0				0	
	JUL – SEP					10			10)				5				4	
	OCT - DEC					30			16					6				13	
<mark>14</mark>)							AIR	POLLUTION			QUIPM	ENT (C		<u> </u>				.5	
	Control Equi	pment	Number																
	Control Equi	pment	Description	on															
	Control Equi	pment	Number																
	Control Equi	pment	on																
								ACTU	AL EN	IISSIONS	3								
	<mark>15</mark> Air Pollutant	Emis	<mark>16</mark> ssion Factor	Eı	miss	17 sion Factor Units		18 Source of E.F.		19 Ash or Su	ılfur %		<mark>20</mark> ined Con fficiency	trol	<mark>21</mark> Transfer Eff	iciency	Actua	<mark>22</mark> I Emissio	ns (Tons/Yr)
	PM-2.5	.009	94	L	bs	s/ton	ΑP	-42					liciency				.12		
	PM-10	.05	5	L	bs	/ton	ΑP	-42									.69		
	SO₂																		
	NOX																		
	voc																		
	со																		
	Lead																		
	Ammonia																		
	AC	TUAL	_ EMISSIC	ons -	- H	APs and addit	iona	l regulated	air p	ollutant	ts – lis	st the p	ollutar	nt na	me in Colu	<mark>mn 15</mark>			

Duplicate this form as needed TYPE ALL INFORMATION (DNR Form 542-4002 November 1, 2006)

^{*}Sources of Emission Factors: CEM .. Stack Test .. Mass Balance .. AP-42 .. WebFIRE.. TANKS.. EPA-L&E .. Worksheet .. Other – Specify

Form INV-4 EMISSION UNIT DESCRIPTION -	ACTUAL	EMISSIONS
FULLI IN V-4 EIVIGGIUN UNIT DESCRIFTIUN -	ACIUAL	

Duplicate this form for EACH Emission UNIT

1) Cor	<mark>mpany</mark> /Faci	lity Na	ame	Gra	ain	Elevator I	nc.						1a) Fo	rm IN	V-4 Page	OH ON		of	
2) Emi	ission Year			20-	-	3)	Emi	ssion Point	Numb	per			EP-2			•			
						EMISS	SION	UNIT – ACT	UAL (OPERATION	ONS AN	ND EMI	SSIONS	5					
4) Emi	ission Unit	Numb	er	EU.	-2						<mark>5</mark>) SC	C Nun	nber	102	200602				
6) Des	scription of	Proce	ess	Nat	tur	al Gas Co	mb	ustion											
					NI.	-11 0		ACTU	JAL T	HROUGH	PUT								
	w Material		·			atural Gas	S		1_	l				- •					
8) Act	tual Throug	hput -	- Yearly To	tai	17	7.75		Actual Oper	9)	Units Ra		erial	MM	CT					
			10) Perce	ent of	Tota	al Operating Ti	me			rs/Day	leduie		12) Da	ys/W	<mark>eek</mark>	1	3) V	Veeks/Qua	arter
JA	AN – MAR				1(0			10)				5				4	
AF	PR – JUN				0)			0					0				0	
JL	JL – SEP				10	0			10)				5				4	
00	CT - DEC				80	0			16	6				6				13	
<mark>14</mark>)							AIR	POLLUTIO	N COI	NTROL E	QUIPMI	ENT (C	E)						
	ontrol Equip																		
	ontrol Equip	•		on															
	Control Equipment Number Control Equipment Description																		
Co	ontrol Equip	pment	Description	on				ACTU	AL EN	NECIONE	,								
	<mark>15</mark>		<mark>16</mark>			17		18		/IISSIONS	1	0	20		21			22	
<u> </u>	ollutant	Emi	ssion Factor	Er	missi	ion Factor Units		Source of E.F.		Ash or Su	lfur %		ined Cor		Transfer Eff	iciency	Actu	ıal Emissio	ns (Tons/Yr)
PN	<mark>/I-2.5</mark>																		
PN	VI-10																		
s	SO ₂	0.6		LI	bs/	/MMcf	ΑP	-42									.01		
N	IOX	100		L	bs/	/MMcf	ΑP	-42									.89)	
V	ос	5.5		LI	bs/	/MMcf	ΑP	-42									.05	5	
C	СО	84		LI	bs/	/MMcf	AP	-42									.75	5	
Le	ead																		
Amr	monia	3.2		L	bs/	/MMcf	We	bFIRE									.03	3	
	<mark>AC</mark>	TUAL	_ EMISSIC	ONS -	- HA	APs and addit	iona	l regulated	l air p	oollutant	s – lis	t the p	ollutar	nt na	<mark>me in Colu</mark>	ımn 15			
He	exane	1.8		LI	bs/	/MMcf	ΑP	-42									.02	2	
Forma	aldehyde	.07	5	LI	bs/	/MMcf	ΑP	-42									.00)	
1																			

Duplicate this form as needed TYPE ALL INFORMATION (DNR Form 542-4002 November 1, 2006)

^{*}Sources of Emission Factors: CEM .. Stack Test .. Mass Balance .. AP-42 .. WebFIRE.. TANKS.. EPA-L&E .. Worksheet .. Other – Specify

Form INV-5 CALCULATIONS

Duplicate this form for each Form it will accompany in the Questionnaire

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	1 01111 1111 - 3 0	ALCOLATIONS					accompany	n the Q	uestionna	aire			
1)	Company/Facility Name	Grain Elevator Inc					1a) Form INV-5	Page Page		of			
<mark>2</mark>)	Emission Point No.	EP-2	3) E	mission Unit	No.	EU-	2						
<mark>4</mark>)	Calculations are provided in	n support of information reported on Form	INV -	3 🖂	4		for the Emission	Point a	nd Emissi	on Unit list	ted above.		
<mark>5</mark>)	Emissions Calculations												
e	levators:	should be followed for colui				grai	in drying pr	oces	s) at g	rain			
	_	or for column grain drying p	•			99.	1-1 = 0094	hs/tr	n (und	control	led		
	ictor)	or for column gram arying p	JO: 7	72, 1			1 1 = 100041	00/10	ZII (GIII)	301111 01	lou		
	M₁₀ emission facto actor)	or for column grain drying p	er A	AP-42, Ta	able 9	.9. 1	I-1 = .055 lb	s/ton	(unco	ontrolle	ed		
Р	otential hourly und	controlled emissions:											
P	M _{2.5} = 84 tons/hr x	.0094 lbs/ton = .79 lbs/hr											
Ρ	$M_{10} = 84 \text{ tons/hr } x$.055 lbs/ton = 4.62 lbs/hr											
T fr	Potential annual emissions: To calculate PM _{2.5} and PM ₁₀ potential annual emissions multiply the highest actual grain throughput from the last five years by 1.2. Multiply the adjusted actual throughput by the emission factor and divide by 2,000.												
	_	ughput in the last five years 2 = 500,000 tons/yr	s = 4	116,667 to	ons/y	r							
		s/yr x .0094 lbs/ton x 1 ton/2 s/yr x .055 lbs/ton x 1 ton/2,0	•				•						

Duplicate this form as needed TYPE ALL INFORMATION (DNR Form 542-4003. November 1, 2006)

Duplicate this form for each Form it will

Form INV-5 CALCULATIONS

					accompany in the c					
1)	Company/Facility Name	Grain Elevator Inc					1a) Form INV-5 Page		<mark>of</mark>	
<mark>2</mark>)	Emission Point No.	EP-2	<mark>3</mark>)	Emission Unit	EU	-2				
<mark>4</mark>)	Calculations are provided in		for the Emission Point a	nd Emissi	on Unit list	ed above.				
<mark>5</mark>)	Emissions Calculations									

This methodology should be followed for column grain dryers (natural gas combustion process) at grain elevators:

Maximum hourly design rate of column grain dryer = .0933 MMcf/hr

SO₂ emission factor per AP-42, Table 1.4-2 = 0.6 lbs/MMcf (uncontrolled factor)

NO_x emission factor per AP-42, Table 1.4-1 = 100 lbs/MMcf (uncontrolled factor)

VOC emission factor per AP-42, Table 1.4-2 = 5.5 lbs/MMcf (uncontrolled factor)

CO emission factor per AP-42, Table 1.4-1 = 84 lbs/MMcf (uncontrolled factor)

NH₃ emission factor per WebFIRE, SCC number 10200602 = 3.2 lbs/MMcf (uncontrolled factor)

Hexane emission factor per AP-42, Table 1.4-3 = 1.8 lbs/MMcf (uncontrolled factor)

Formaldehyde emission factor per AP-42, Table 1.4-3 = .075 lbs/MMcf (uncontrolled factor)

Potential hourly uncontrolled emissions:

 $SO_2 = .0933 \text{ MMcf/hr } \times 0.6 \text{ lbs/MMcf} = .06 \text{ lbs/hr}$

 $NO_x = .0933 \text{ MMcf/hr } x 100 \text{ lbs/MMcf} = 9.33 \text{ lbs/hr}$

 $VOC = .0933 \, MMcf/hr \times 5.5 \, lbs/MMcf = .51 \, lbs/hr$

 $CO = .0933 \text{ MMcf/hr} \times 84 \text{ lbs/MMcf} = 7.84 \text{ lbs/hr}$

 $NH_3 = .0933 \, MMcf/hr \times 3.2 \, lbs/MMcf = .30 \, lbs/hr$

Hexane = $.0933 \text{ MMcf/hr} \times 1.8 \text{ lbs/MMcf} = .17 \text{ lbs/hr}$

Formaldehyde = .0933 MMcf/hr x .075 lbs/MMcf = .01 lbs/hr

Potential annual emissions:

To calculate potential annual emissions multiply the highest actual grain throughput from the last five years by 1.2. Multiply the adjusted actual throughput by the fuel to grain ratio (.607 MMBtu/ton) and then by the emission factor and divide by 2,000.

Highest actual throughput in the last five years = 416,667 tons/yr

416,667 tons/yr x 1.2 = 500,000 tons/yr

500,000 tons/yr x .607 MMBtu/ton x MMcf/1,050 MMBtu = 289.05 MMcf/yr

 $SO_2 = 289.05 \text{ MMcf/yr x } 0.6 \text{ lbs/MMcf x } 1 \text{ ton/2,000 lbs} = .09 \text{ tons/yr}$

 $NO_x = 289.05 \text{ MMcf/yr x } 100 \text{ lbs/MMcf x } 1 \text{ ton/2,000 lbs} = 14.45 \text{ tons/yr}$

VOC = 289.05 MMcf/yr x 5.5 lbs/MMcf x 1 ton/2,000 lbs = .79 tons/yr

CO = 289.05 MMcf/yr x 84 lbs/MMcf x 1 ton/2,000 lbs = 12.14 tons/yr

 $NH_3 = 289.05 \text{ MMcf/yr x } 3.2 \text{ lbs/MMcf x } 1 \text{ ton/2,000 lbs} = .46 \text{ tons/yr}$

Duplicate this form as needed TYPE ALL INFORMATION (DNR Form 542-4003. November 1, 2006)

Form INV-5

Form INV-5 CALCULATIONS

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Duplicate this form for each Form it will accompany in the Questionnaire

1)	Company/Facility Name	Grain Elevator Inc						1a) Form INV-5 Page		<mark>of</mark>				
<mark>2</mark>)	Emission Point No.	EP-2	3) I	Emi	ssion Unit	No.	EU-	-2						
<mark>4</mark>)	Calculations are provided in	n support of information reported on Form	INV -	3		4		for the Emission Point a	nd Emissi	on Unit list	ed above.			
<mark>5</mark>)	Emissions Calculations													
To you the	Potential annual emissions (continued): To calculate potential annual emissions multiply the highest actual grain throughput from the last five years by 1.2. Multiply the adjusted actual throughput by the fuel to grain ratio (.607 MMBtu/ton) and then by the emission factor and divide by 2,000. Highest actual throughput in the last five years = 416,667 tons/yr 416,667 tons/yr x 1.2 = 500,000 tons/yr 500,000 tons/yr x .607 MMBtu/ton x MMcf/1,050 MMBtu = 289.05 MMcf/yr Hexane = 289.05 MMcf/yr x 1.8 lbs/MMcf x 1 ton/2,000 lbs = .26 tons/yr													
		//Of/yr x 1.8 lbs/MMcf x 1 to 9.05 MMcf/yr x .075 lbs/MMc	•					•						

Duplicate this form as needed TYPE ALL INFORMATION (DNR Form 542-4003. November 1, 2006)

Form INV-5

Duplicate this form for each Form it will accompany in the Questionnaire

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Form INV-5 CALCULATIONS

1)	Company/Facility Name	Grain Elevator Inc						1a) Form INV-5 Page		of	
<mark>2</mark>)	Emission Point No.	EP-2	3) I	Emissio	on Unit	No.	EU-	2			
<mark>4</mark>)	Calculations are provided in	n support of information reported on Form	n INV -	3 [4 🖂		for the Emission Point a	nd Emissi	on Unit list	ed above.
<mark>5</mark>)	Emissions Calculations										
el	levators:	should be followed for colu om all processes at Group		_	-		_				ıal
<u>tł</u>		m the applicable emission									_
T		emissions, multiply the act v 2,000.	tual	graiı	n thr	ough	put	by the appropri	ate em	nission	
		x .0094 lbs/ton x 1 ton/2,00 x .055 lbs/ton x 1 ton/2,000									

Duplicate this form as needed TYPE ALL INFORMATION (DNR Form 542-4003. November 1, 2006)

Duplicate this form for each Form it will accompany in the Questionnaire

Form INV-5 CALCULATIONS

1)	Company/Facility Name	Grain Elevator Inc					1a) Form INV-5	Page		of	
<mark>2</mark>)	Emission Point No.	EP-2	3) E	Emission (Jnit No.	EU-	-2				
<mark>4</mark>)	Calculations are provided in	n support of information reported on Form	n INV -	3 🗌	4 🗵		for the Emission	Point a	nd Emissi	on Unit list	ed above.
<mark>5</mark>)	Emissions Calculations										
g A	rain elevators:	should be followed for colu om all processes at Group m the applicable emission	2 G	rain El	-		_		-		
T	ctual emissions: o calculate actual o actor and divide by	emissions, multiply the act 2,000.	tual	natura	l gas t	hrou	ughput by th	пе ар	propri	ate emi	ission
N C N H	$O_x = 17.75 \text{ MMcf x}$ $OC = 17.75 \text{ MMcf x}$ $O = 17.75 \text{ MMcf x}$ $H_3 = 17.75 \text{ MMcf x}$ $O = 17.75 \text{ MMcf x}$ $O = 17.75 \text{ MMcf x}$	0.6 lbs/MMcf x 1 ton/2,000 100 lbs/MMcf x 1 ton/2,000 x 5.5 lbs/MMcf x 1 ton/2,000 lb 3.2 lbs/MMcf x 1 ton/2,000 cf x 1.8 lbs/MMcf x 1 ton/2,7 75 MMcf x .075 lbs/MMcf x) lbs) lbs bs = lbs : 000	s = .89 t s = .05 t : .75 to = .03 to lbs = .0	ons ons ns ons O2 tons		tons				

Duplicate this form as needed TYPE ALL INFORMATION (DNR Form 542-4003. November 1, 2006)